STATEWIDE LANDFILL INVENTORY
INTERIM REPORT

BY

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Illinois Hazardous Waste Research and Information Center

EXECUTIVE SUMMARY

The purpose of the Statewide Landfill Inventory is to determine the location of all known landfill, impoundment, and land application waste disposal sites in Illinois in which hazardous wastes may have been disposed. To accomplish this purpose, all of these types of disposal sites in Illinois are being inventoried and characterized. This is being accomplished by compiling information from agency data files, published reports, and county records.

The project is divided into three tasks which are listed below. Following the description of each task are the major items of progress or understanding achieved for that task.

Task 1: An inventory of known disposal sites in Illinois is being compiled from federal, state, and county sources, and specific descriptions (as available) for each site are being entered into a computer data file. The information listed in the file for each site relates to: location, type, hydrogeologic setting, waste sources(s), and background.

Sources of information currently being processed include:

1) National Technical Information Service (NTIS) file of sites for the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) - computer tape.
2) NTIS file of sites for the Resource Conservation and Recovery Act (RCRA) - computer tape.
3) United States Environmental Protection Agency (EPA) file of Illinois data from the Surface Impoundment Assessment System (SIA) - computer tape .
4) Illinois Environmental Protection Agency (IEPA) Selected Inventory File - computer tape and also in microfiche format.
5) Metropolitan Sanitary District of Greater Chicago (MSDGC) list of Cook County waste facilities - computer tape.

Other sources of information incorporated into the inventory of waste disposal sites include:

1) Sites identified by Craig E. Colten of the Illinois State Museum (ISM) in a study of the area around Lake Calumet.
2) Sites identified in a study of surface impoundments in Illinois by Rauf Piskin, Linda Kissinger, Michael Ford, Steve Colantino, and John Lesnak, of IEPA.
3) Sites identified in a study of Winnebago County by Hannah Nickolai and Virginia Gregory of the Rockford-Winnebago County Planning Commission.
4) Each county in Illinois will be contacted through an appropriate responsible individual to determine the location of former waste disposal sites not on record with IEPA. A pilot study is underway for DeWitt County. The remaining counties will be contacted as the computer information is processed on a county-by-county basis.

Task 2: Incorporation of this information into the Hazardous Waste Research and Information Center (HWRIC) data base.

1) A computer format has been developed for the storage of information in the INFO data storage system of the Prime 750 Computer at the Illinois Natural History Survey (INHS). When the HWRIC Prime Computer is operational this data base will be transferred to that system.

Task 3: Preparation of a report and map summarizing the site inventory and background data.

1) The Interim Report (June, 1985) follows this executive summary. A Final report will be submitted August 31, 1985. The final

report will incorporate additional data obtained from visits to selected counties and information on disposal impoundments.

2) The map which accompanies this Interim Report is at a scale of 1:1,000,000, and each site currently digitized in the computer file is represented by a small square. The computer file is compatible with the Geographic Information System (GIS).

3) The map to accompany the final report will be at a scale of 1:500,000 so that it can be directly compared with many other maps prepared by the Illinois State Geological Survey (ISGS) at that scale. This map printed on transparent film may be directly overlaid onto multicolored maps.

4) A set of map symbols, which can be produced by the computer, has been developed to identify six different parameters related to disposal activities. The symbols are shown below.

		hazardous	nonhazardous	unknown
		H	O	U
burial	X			
impoundment	I			
land application	—			

5) Special smaller scale maps can be prepared for areas with a large concentration of data points.

RESULTS AND RECOMMENDATIONS

A list of results and recommendations for the final report is being compiled as the study develops. The current list is as follows:

RESULTS

1) This study is an inventory of data available from a large but limited number of sources; however, the data base is designed to accommodate additional data in the future.
2) The items of information included in this Inventory reflect the purpose and scope of this study. This information is displayed in English language rather than numeric codes so that it might be more widely understood by public users; yet, it can be processed and sorted electronically.
3) In this phase of the study hydrogeologic studies on individual sites were not performed.
4) The results of this study suggest less known sources of information to be pursued.

RECOMMENDATIONS

1) Waste disposal sites for which sufficient information is not available should be identified and listed.
2) These sites should be ranked according to the apparent relative need for additional study based on the types of waste(s) disposed, volume of waste, method of disposal, age of the site, and the hydrogeologic conditions (either natural or modified) at the site.
3) Time and cost requirements for the additional studies of ranked sites should be estimated and evaluated from an economic viewpoint.
4) The decision to perform additional studies for any site should be based on the three preceeding steps.

5) Field research studies at waste disposal sites in Illinois should be preceeded by an evaluation of the hydrogeologic conditions at those sites.

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INTRODUCTION

Purpose

The Hazardous Waste Research and Information Center (HWRIC) has a mandate to provide technical support, research, and service toward the development of a comprehensive hazardous waste management strategy for Illinois (Barcelona and Garrison, 1985). The research program of HWRIC is divided into four areas. This study addresses an aspect of problem characterization and assessment. The results will be a comprehensive data base of landfill, impoundment, and land application waste disposal sites in the state. Included will be descriptions of site locations and their important characteristics such as size and type of waste disposed.

Before the magnitude and extent of the hazardous waste problem in Illinois can be properly assessed, it is necessary to have information on locations and characteristics of former and current methods of waste disposal. The purpose of this study is to gather and list the available sources of basic data on all known waste disposal sites in the state. An inventory of known disposal sites is being collected from all known sources, and each site is being described as to: location, type, hydrogeologic setting, waste source(s), and background data (site history, previous studies, and records of operation and monitoring). The above information will be incorporated into the HWRIC data base where it can serve all three program areas: Research, Information, and Industrial and Technical Assistance. The site locations are being digitized into a computer mapping system, which is compatible with the Geographic Information System (GIS), so that the relationship of waste disposal activities to other subjects of spatial consideration (such as groundwater and geology) can be easily studied.

Scope

This study primarily focuses on sites where disposal activities either are occurring or have occurred. Thus, the following type of operations are excluded from this study: the generation of waste(s) (unless a portion of the facility is used intentionally for disposal); the storage of wastes; waste transfer stations; the transportation of wastes; and waste treatment facilities. Incineration is noted only if it occurs at a land disposal site. Disposal by discharge into surface waterways is also outside the scope of this study.

The three methods of disposal included in this study involve the intent to permanently dispose of waste on land. (A few sites originally intended for permanent disposal have been partially or completely exhumed.)

Land burial of waste is a common and longstanding practice in Illinois. Even though recycling and incineration may reduce the volumes of waste, some residue will remain and will probably be buried at a land disposal site.

Impoundments or lagoons allow waste materials to either precipitate or settle out of a fluid waste stream. In many industrial and mining operations it is common to utilize tailing ponds to collect fine-grained waste products before disposing of the clarified liquids. In Illinois, the brines collected along with the production of oil and gas have, in the past, been disposed of in "evaporating" ponds. Unfortunately, in this climatic zone the annual rate of evaporation does not exceed the annual rainfall, and the brines, rather than evaporating, have infiltrated into the shallow groundwater system. This practice, which is regulated by the Illinois Department of Mines, is now being stopped in lieu of underground injection back into source formations.

The land application of wastes or land farming of wastes has been used to a relatively limited extent as a method to dispose of some types of wastes in

Illinois. These wastes are usually thickened sludges derived, for example, from the dredging of waterways, refining of petroleum, or the treatment of municipal sewage. This method has not been used extensively because many of the high volume sources of sludge contain trace amounts of a few objectionable chemical components for example, some of the heavy metals and some organic compounds. Also there is public concern that these components might enter the food chain with unfavorable results.

In the search for waste disposal sites which predate the establishment of IEPA, it has been arbitrarily decided that a site with an area less than one acre in size will not be included in the Inventory unless it is suspected of containing hazardous waste. Some construction sites in urban areas utilize demolition debris as fill material under driveways and parking lots, but these sites are not considered to be waste disposal sites in the sense of this Inventory.

METHODS OF STUDY

Inventory

Information for the Inventory is being obtained from a number of sources at the federal, state, and county levels of government. Copies of tapes containing computer files which included waste disposal sites were obtained through the Illinois State Water Survey (ISWS) for the following sources of information: the National Technical Information Service (NTIS) file of sites for the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) more commonly known as Superfund; the NTIS file of sites for the Resource Conservation and Recovery Act (RCRA); the United States Environmental Protection Agency (EPA) file of Illinois data from the Surface Impoundment Assessment System (SIA);the Illinois Environmental Protection Agency (IEPA) Selected Inventory File; and the Metropolitan Sanitary District of Greater

Chicago (MSDGC) list of Cook County waste facilities. Other sources of written information related to waste disposal sites not listed above include: Inventory and Assessment of Surface Impoundments in Illinois (Piskin, et al., 1980); Inventory of Historic Solid Waste Disposal Sites in Winnebago County (Nickolai and Gregory, 1981, and Nickolai, 1982); and Industrial Wastes in the Calumet Area, 1869-1970, An Historical Geography (Colten, 1985).

Each county in Illinois (except Winnebago, for which complete information is already available) will be contacted through an appropriate responsible individual to determine the location of former waste disposal sites not on record with IEPA. The initial contact will be by telephone to determine the name of a responsible individual in a county agency such as health, highway, or planning department, and to briefly describe the purpose of the Statewide Landfill Inventory and ask for cooperation from that person. A letter of explanation will then be sent with an enclosed computer print-out list of inventoried sites and a computer generated map showing the locations of the sites.

To determine the feasibility and effectiveness of contacting the counties individually, a pilot study is being conducted in DeWitt County. Contact has been made with Mr. Mark Smith of the DeWitt County Department of Planning and Zoning to identify former disposal sites. He has enlisted assistance from Mr. James Henricks of the DeWitt-Piatt Bi-County Health Department. DeWitt County was selected because of its rural character, moderate size, and proximity to Champaign. The information obtained in this pilot study will be compared to the similar information presented in the study in more industrialized Winnebago County (Nickolai and Gregory, 1981, and Nickolai, 1982).

Computer Format

A copy of a print-out of the sample form of the Inventory is shown on the

COMPUTER SAMPLE FORM

A IEPA No. 0000000000 SITE NAME: SAMPLE FORM

B LOCATION:
COUNTY: ILLINOIS CITY/TOWNSHIP: ANYWHERE
LATITUDE:123456 LEGAL:WWXXYYZZ SEC.00 T.00N R. 00E, 0 PM
LONGITUDE: 123456 LAMBERT-PHI:X 0 Y 0

C OWNER: ANYONE LANDFILL SIZE
OPERATOR: NOONE IN ACRES: 0

D SOURCES OF DATA:

1) IEPA	5) DPH
2) ISGS	6) LOCAL HD
3) PCP	7) OTHER AGENCY
4) IDM&M	8) OTHER X

E TYPE OF DISPOSAL: C

1) OPEN DUMP = A	4) INCINERATION = D
2) SECURED CONTAINERS = B	5) SURFACE IMPOUNDMENT = E
3) LANDFILL = C	6) LAND APPLIC. = F

F HYDROGEOLOGIC REPORT AT: (P=PRELIMINARY, D=DETAILED, PD, NO, X)
1) HWRIC 2) IEPA 3) ISGS 4) OTHER X

G SOURCE(S) AND TYPES OF WASTE:

1) GENERAL SOLID WASTE	10) HAZARDOUS SOLIDS
2) MUNI. SEWAGE SLUDGE	11) HAZARDOUS LIQUIDS
3) SEPTIC SLUDGE	12) RADIOACTIVE WASTE
4) ANIMAL WASTE	13) DEMOLITION DEBRIS
5) PATHOLOGICAL WASTE	14) CONCRETE/ASPHALT
6) INDUSTRIAL WASTE	15) LANDSCAPING WASTE
7) FOUNDRY SAND	16) OIL FIELD BRINE
8) SLAG	17) TIRES
9) INCINERATOR ASH	18) OTHER X
	19) UNKNOWN

H BACKGROUND DATA:
1) STATUS: INACTIVE
2) PERMIT STATUS: UNPERMITTED
3) DATE OPENED: 0 4)DATE CLOSED 0 5) GW MONITORING: XXX

I MISCELLANEOUS INFORMATION: (ON FILE AT)
1) PREVIOUS STUDIES: SOMEWHERE
2) SITE PLANS: NOWHERE
3) OPERATION RECORDS: POSSIBLY
4) MONITORING DATA: YOURE KIDDING
5) OTHER RECORDS: OTHER WORLDS

decided to use the IEPA identification numbering system for this inventory. The identification number is based on the FIPS code which is a federal location numbering system. The first three digits are the county code; the next three digits are the city/township code; and the final digits are the site code. The site codes are assigned in chronological order for all of the different types of wastes handlers. This Inventory will identify former sites which do not have assigned IEPA identification numbers. These sites will be given provisional numbers using the county and city/township codes, but the site code digits will be temporarily identified by letters rather than numbers until they are incorporated into IEPA files and given an identification number.

The IEPA format includes means for identifying the locations of waste disposal sites by legal land description in the Congressional Township System, and also by latitude and longitude. Some sites in the IEPA file are either not fully identified or not identified at all, by legal description. Some sites are not identified by latitude and longitude, and the accuracy of some of the listed latitude and longitude figures are questioned because many figures for seconds appear to be rounded off to zero.

A third method of locating sites, Lambert-Phi coordinates, is used in this inventory for the purpose of being able to plot the site locations on maps by means of a computer digitizer (DuMontelle et al., 1968 and Swann et. al., 1970).

The other items contained in the computer format are more or less self-explanatory in nature. In item G the list of source(s) and types of waste is not identical to the list of terms used by IEPA to provide more flexibility in describing the older waste disposal sites.

Problems in Data Collection and Processing

One type of site, illegal dump, was not sorted from the computer tape due to a technical problem, and these sites are being visually sorted from the microfiche file copy for inclusion into the Inventory. A few sites of inappropriate types such as generators, storage, and transporters were sorted into the Inventory and these sites are geing visually identified from the microfiche file copy and deleted from the Inventory.

The information on types and sources of waste in the computer tape files are not in a form that can be easily transferred into the Inventory, and these items must be obtained visually from the microfiche format, hand recorded, and then entered into the Inventory. This work is proceeding systematically.

Some needed items of information are missing or unavailable in the computer tape file, and these items must be obtained from the paper records of IEPA in Springfield. This work will be time-consuming and, in addition, costly because of travel expenses. A tentative schedule has been arranged with IEPA for one person to visit the Records Section on Thursdays and Fridays to obtain this information.

Contacting all of the remaining 100 counties in the state will be a lengthy procedure. The list of sites for each county must be checked to see that all of the disposal sites are included and that only disposal sites are listed. After the list for one county is fully checked the map for that county can be generated by the computer, and then contact can be made.

III. INCORPORATION OF INFORMATION INTO HWRIC DATA BASE

The Statewide Landfill Inventory data are stored in the Prime 750 Computer housed at the Illinois Natural History Survey (INHS) in the Natural Resources Building, Champaign, Illinois. This is a suitable repository for the Inventory to remain in until HWRIC provides another location for it. At

the completion of this project the information stored in the Inventory will be accessible to other researchers and interested persons upon request.

IV. COMPUTERIZED MAP PRODUCTION

A Preliminary Map of Waste Disposal Sites in Illinois is attached at the back of this report. The map is at a scale of 1:1,000,000 or approximately 16 miles per inch. The only features shown other than the disposal sites are county boundaries. The county names are not indicated so that the sites, represented by small squares, stand out more distinctly. At this stage of data gathering not all the sites can be plotted on the map by the computer, and the sites shown are those for which the legal land description have been converted into Lambert-Phi coordinate values. The legal land descriptions are either missing or incomplete for some sites, and these cannot be plotted until the proper information is obtained. The final report will contain an appended list of sites which cannot be shown on the map accompanying the report.

The map which will accompany the final report will be plotted at a scale of 1:500,000 or approximately 8 miles per inch. Because this is the same scale that has been used by ISGS for printing many maps such as bedrock geology, surficial deposits, drift thickness, and susceptibility of shallow aquifers to pollution it will allow easy visual comparison of these maps. When the map of disposal sites is printed on a transparent film it may be used with the other maps as a direct overlay.

A set of map symbols, which can be produced by the computer, has been developed to identify six different parameters related to disposal activities. The three parameters related to methods of disposal and the respective symbols are: burial, X; impoundment, 1; and land application --. The three parameters related to types of waste materials and the respective symbols are: hazardous, H; nonhazardous, O; and unknown, U. When the symbols of

these parameters are placed in a matrix they form a set of nine distinguishable symbols as shown in the following table.

		hazardous	nonhazardous	unknown
		H	O	U
burial	X	⋈	⊠	⊠
impoundment	I	⫼	⊘	⊍
land application	—	⫶	⊖	⊎

The map to accompany the final report will utilize the system of nine combination symbols, but a number of special interest maps could be produced by using selected combinations of parameters.

V. DISCUSSION

This study, which is still in progress, is an inventory of data collected from a fairly limited number of sources. The Inventory is designed to be open-ended for the collection of additional data in the future. DeWitt County has been contacted at the local level to assist in identifying other waste disposal sites which are unrecorded at the state level. Efforts to contact other counties will begin this summer.

The items selected for inclusion in the Statewide Landfill Inventory are not identical to those included in the IEPA Selected Inventory file due to basic differences of purpose between IEPA and HWRIC. IEPA is charged with regulatory and enforcement duties, while HWRIC, from the standpoint of this study, is to serve as guidance for future research and as a clearinghouse on information to the public, industry, and the scientific community. This Inventory is in an English language format which is much easier to understand than the numerically coded format of the IEPA computer file, and yet both files can be processed and sorted electronically.

In this early phase of the Inventory it is not possible, due to the short time-frame, to perform any hydrogeologic studies on individual sites. Sites will be identified as having either preliminary or detailed studies available, or no studies available.

VI. ADDITIONAL STUDIES NEEDED

The information available for some waste disposal sites is inadequate to properly characterize or evaluate them from the standpoint of risk from pollution of groundwater. The problem of risk might depend on the type(s) of wastes disposed of at the site, the method of disposal, the age of the site, the hydrogeologic setting of the site, or from a combination of two or more of these factors. Sites subject to risk for these reasons should be identified and listed.

These sites should be ranked on the basis of the perceived relative need for additional study. A rating system will have to be devised by some empirical method to place relative values on the missing information.

Time and cost requirements for the additional studies of ranked sites should be estimated and evaluated from an economic viewpoint. Disposal sites suspected of containing hazardous wastes and sites located in areas with a high potential for groundwater contamination should be more thoroughly evaluated.

The decision to perform additional studies for any site should be based on the three preceeding steps. It should be emphasized that the studies identified as being needed are secondary data analyses of records and other information on file at several state and federal agencies.

VII. REFERENCES

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VIII. ACKNOWLEDGEMENTS

Grateful acknowledgement is expressed to the staff members who have worked on the tasks herein reported: Bruce Hensel, David Brutcher, David Hardt, and Robert Mackean. Hensel performed the original interpretation of the data source tapes, entered the Inventory format into the computer, and supervised the transfer of data from the source tapes into the Inventory. Brutcher, Hardt, and Mackean are University of Illinois students who were hired on a temporary basis to transfer data from the various sources into the form used in this Inventory, to enter the data into the HWRIC data base, and to work on the plotting program for the map. Brutcher and Hardt plan to stay on to the termination of this contract, August 31, 1985, but Mackean will be leaving July 5, 1985.

Other staff members who contributed to this effort are: Thomas Johnson who has provided guidance and counsel, and Edna Yeargin who processed the manuscript. The map titles were prepared by David Hardt, and the report was reviewed by Bruce Hensel and Edward Mehnert.

Thanks are due to Bonnie DeLay, Robert Kuykendall, and Robert Mathis of IEPA for cooperation in providing access to file information. Special thanks are expressed to Mark Smith and James Henricks of DeWitt County for their assistance in locating former disposal sites.

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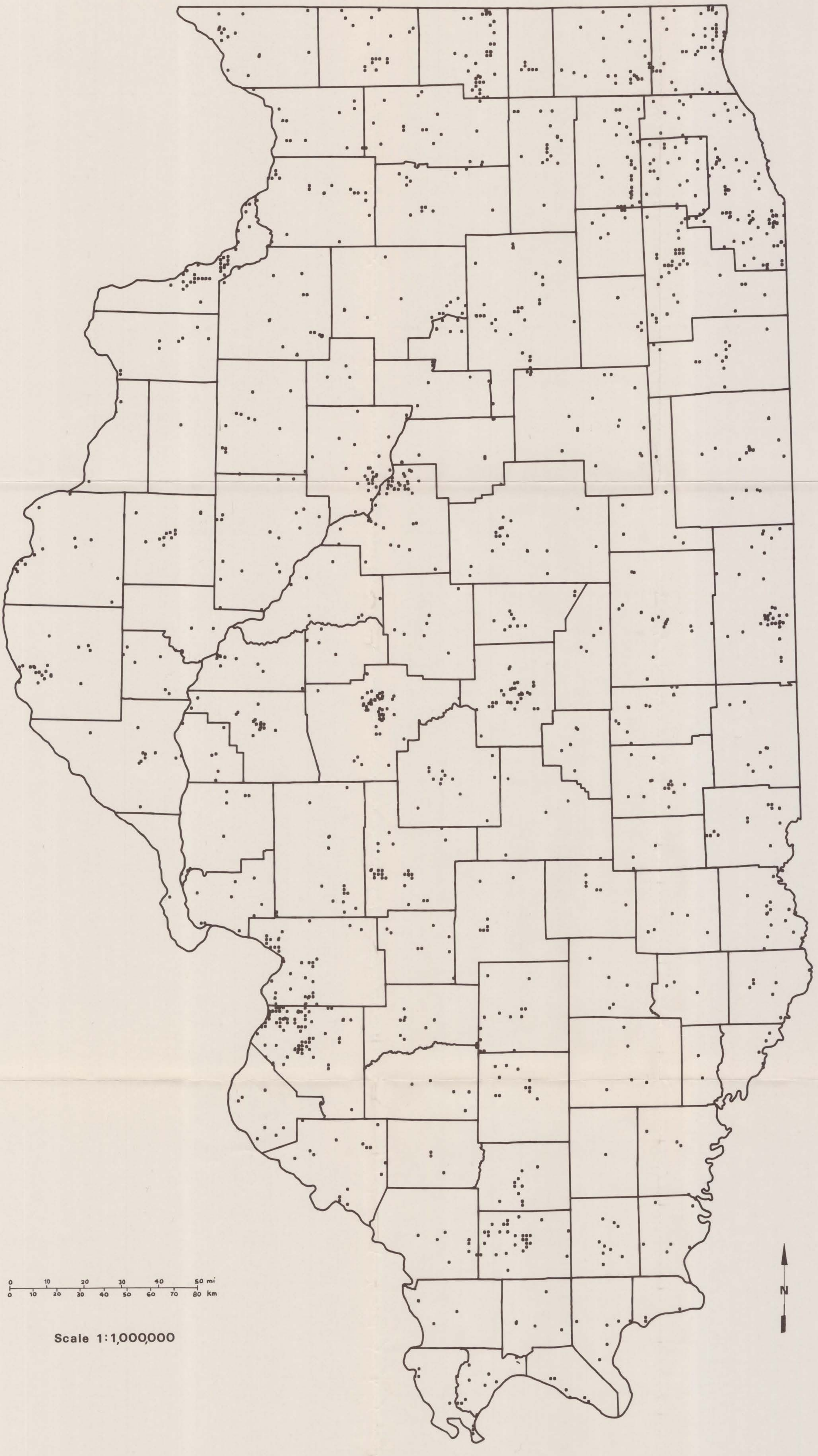

Preliminary Map of Waste Disposal Sites in Illinois

ISGS June 1985